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Activities of the International Society for Photogrammetry and Remote Sensing (ISPRS)

(Paper submitted by ISPRS)**

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Activities of the International Society for Photogrammetry and Remote Sensing (ISPRS)

- Background Paper for the 1997 UN Regional Cartographic Conferences -
3-7 February 1997, Bangkok, Thailand
2-6 June 1997, New York, USA

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ABSTRACT

The paper introduces the organization of ISPRS and its current activities in and related to cartography. The programs of ISPRS include many topics of advanced technologies for cartographic applications. The activities include the scientific and technologic program established for the 1996-2000 period which is being conducted in various Working Groups within the domain of the seven ISPRS Commissions.

INTRODUCTION

Advanced technologies being developed in the progression of the "Computer Age", "Information Age". "Space Age" and "Multimedia Age" have and continue to become strong tools to support modern cartographic or mapping methodologies.

Within the scope of ISPRS, they include commercial very high resolution satellite sensor systems capable of providing sub-meter ground resolutions; Synthetic Aperture Radar (SAR) interferometry for generating digital elevation models (DEM); integrated sensor systems for imaging using Global Positioning (GPS) and Inertial Navigation (INS) Systems; mobile mapping systems for ground navigation; digital photogrammetry for accurate GIS (Geographic Information System) data extraction and attribution; image understanding for automated extraction of human-made structures from digital imagery: 3D (three dimensional) GIS theory for advanced applications; integration of remote sensing and GIS for resource and management applications; global mapping for science; etc.

For the 1996-2000 period, the ISPRS has restructured its institutional scheme and the emphases for its activities to meet the requirements and demands of such highly advanced technologies. This restructuring gives recognition to the many socio-techno-economic changes to society which impact the need and use of imagery data for the cartographic disciplines, that is:

from analog to digital;
from paper maps to electronic media;
from air survey to space remote sensing;
from static to dynamic measurement;
from single to multi-disciplinary profession;
from centralized to distributed networks;
from manual to automated operations; and
from closed to open data policy.

ORGANIZATION OF ISPRS

a. *Mission*

The ISPRS is a nongovernmental organization (NGO) devoted to the development of international cooperation for the advancement of photogrammetry and remote sensing and their applications. Photogrammetry and Remote Sensing is the art, science and technology of obtaining reliable information from noncontact imaging and other sensor systems about the Earth and its environment, and other physical objects and processes through recording, measuring, analyzing and representation.

The Society's scientific interest shall include photogrammetry, remote sensing, spatial information systems, and related disciplines, as well as applications in cartography, geodesy, surveying, natural, Earth and engineering sciences, and environmental monitoring and protection. Further applications include industrial design and manufacturing, architecture and monument preservation, medicine and others.

In pursuit of these interests, ISPRS actively promotes cooperation and coordination with relevant organizations of the UN and with other science and engineering societies and organizations.

b. *Activities*

Founded in 1910, ISPRS is the international representative to the international science and technology community. Its membership represents societies and organizations from over 100 nations and regions. To achieve its aims, the Society shall:

1. **Hold an International Congress every four years and convene Commission Symposia** two years after each Congress. In recent decades, the ISPRS Congress has had 2 to 3,000 participants, with presentations of about 1,000 papers, and has attracted many thousand more attendees to its concurrent exhibition. The most recent ISPRS Congresses have convened at:

   1980 The 14th Congress, Hamburg, Germany
   1984 The 15th Congress, Rio de Janeiro, Brazil
   1988 The 16th Congress, Kyoto, Japan
   1992 The 17th Congress, Washington, DC, USA
   1996 The 18th Congress, Vienna, Austria

2. **Initiate and coordinate research in the fields of photogrammetry and remote sensing by creating Technical Commissions and Working Groups** concerned with particular aspects of photogrammetry and remote sensing. For the 1996-2000 period Commissions on the following topics have been established with leadership responsibility designated to the country as follows:

   Commission I: **"Sensors, Platforms and Imagery"**
   5 WG's
   President: George Joseph
   Space Application Centre
   Ahmedabad 380 053, INDIA

   Commission II: **"Systems for Data Processing, Analysis and Representation"**
   8 WG's
   President: Ian Dowman
   Department of Photogrammetry and Surveying, University College London
   Gower Street, London WC1E 6BT, UK

Commission III: **"Theory and Algorithms"**
6 WG's
President: Toni Schenk
Dept. of Civil & Environmental Engineering, The Ohio State University
470 Hitchcock Hall, 2070 Neil Avenue, Columbus, OH 43210-1247, USA

Commission IV: **"Mapping and Geographic Information Systems"**
6 WG's, 2 IC WG's
President: Dieter Fritsch
Institute of Photogrammetry, University of Stuttgart
Keplerstrasse 11, D-70174, Stuttgart, GERMANY

Commission V: **"Close-Range Techniques and Machine Vision"**
5 WG's, 1 IC WG, 1 SI WG
President: Hirofumi Chikatsu
Dept. of Civil Engineering, Tokyo Denki University
Ishizaka, Hatoyama, Saitama 350-03, JAPAN

Commission VI: **"Education and Communications"**
4 WG's
President: Klaas Villanueva
Jurusan Teknik Geodesi FTSP, Institute Teknologi Bandung
Jalan Ganesha 10, Bandung 40132, INDONESIA

Commission VII: **"Resource and Environmental Monitoring"**
7 WG's
President: Gabor Remetey-Fülöpp
Dept. of Lands and Mapping, Ministry of Agriculture
P.O. Box 1, H-1860, Budapest 55, HUNGARY

For the 1996-2000 term, 41 Working Groups (WG), three Inter-Commission Working Groups (IC WG), and one Special Interest Working Group (SI WG) have been established. The Working Groups are comprised of international experts who address specific topics outlined in WG 'Terms of Reference'. Each Working Group operates within its relevant Commission.

3. Publish and circulate the results of research and the records of discussion at the Congress , Symposia, Workshops, Tutorials and other events sponsored by ISPRS.

The following publications are published and circulated among the ISPRS members and to organizations which collaborate or have an interest in ISPRS technologies and affairs.

- Archives: the ***International Archives of Photogrammetry and Remote Sensing*** contain the proceedings and records of all ISPRS Congresses, Symposia and of selected ISPRS sponsored Workshops, Conferences and Tutorials
- Official Journal: the ***ISPRS Journal of Photogrammetry and Remote Sensing*** contains peer reviewed papers and is published bimonthly by Elsevier Science.
- Annual Report: a report of the state of the science and technology and activities of ISPRS Commissions and working groups is published annually.
- ISPRS News Bulletin: the ***ISPRS Highlights*** is a new quarterly perfect bound publication containing current information about activities of ISPRS activities and news of relevant technologies. It is distributed free to ISPRS members.
- ISPRS Home Page: located at http://www.geod.ethz.ch/isprs and updated frequently.
- Blue Book: the **ISPRS Member List** is updated and published once a year

- Silver Book: published quadrennially, the ***ISPRS Organization and Programs 1996-2000*** outlines the current ISPRS organization, including all 'Terms of Reference' of the Commissions and WG's and their officers; Statutes and Bylaws, guidelines, rules of Awards in English, French and German; an overview of the history, objectives, activities; and officer addresses.
- Minutes of Council Meetings/Joint Meetings: are distributed to ISPRS members.

c. ***Membership*** -The categories of ISPRS membership are:

- **Ordinary Members (99)** - are the single organization of a country, or geographic region thereof having an independent budget, which represents the whole community of photogrammetrists and remote sensing experts in the country or region. They include the following:

Albania,	Egypt,	Lithuania,	South Africa,
Algeria,	Eritrea,	Madagascar,	Spain,
Argentina,	Ethiopia,	Malawi,	Sri Lanka,
Australia,	Finland,	Malaysia,	Sudan,
Austria,	France,	Mexico,	Surinam,
Azerbaijan,	Germany,	Mongolia,	Sweden,
Belarus,	Ghana,	Morocco,	Switzerland,
Belgium,	Greece,	Myanmar,	Syria,
Bolivia,	Hong Kong,	Namibia,	Taipei-China,
Botswana,	Hungary,	Nepal,	Tanzania,
Brazil,	India,	Netherlands,	Thailand,
Brunei,	Indonesia,	New Zealand,	Tunisia,
Bulgaria,	Iran,	Nigeria,	Turkey,
Burkina Faso,	Iraq,	Norway,	Ukraine,
Canada,	Ireland,	Pakistan,	United Arab Emirates
Chile,	Israel,	Peru,	United Kingdom,
China,	Italy,	Philippines,	United States,
Colombia,	Japan,	Poland,	Uruguay,
Congo,	Jordan,	Portugal,	Venezuela,
Côte d'Ivoire,	Kenya,	Qatar,	Vietnam,
Croatia,	Korea,	Romania,	Yugoslavia,
Cuba,	Kuwait,	Russia,	Zaire,
Cyprus,	Latvia,	Saudi Arabia,	Zambia,
Czech Republic,	Lebanon,	Slovakia,	Zimbabwe.
Denmark,	Libya,	Slovenia,	

- **Associate Members (6)** - represent a community of photogrammetrists, remote sensing experts and/or spatial information system experts in a country which are not represented by the Ordinary Member organization of the country.

- **Regional Members (7)** - represent specialists and experts of geographic regions.
  Asian Association on Remote Sensing (AARS),
  African Association of Remote Sensing of the Environment (AARSE),
  European Association of Remote Sensing Laboratories (EARSeL),
  Organisation Africaine de Cartographie et Télédétection (OACT),
  Organisation Europeene d'Etudes Photogrammetriques Experimentales (OEEPE),
  Pan American Institute of Geography and History (PAIGH), and
  Sociedad de Especialistas Latinoamericana en Percepcion Remota (SELPER).

- **Sustaining Members (35)** - contribute regularly to the financial support of the Society.

- **Honorary Members**: M. Georges de Masson d'Autume (France); Dr. Frederick J. Doyle (USA); Mrs. Aino Savolainen (Finland); Prof. Dr. Wang Zhizhou (China); Prof. Dr. Gottfried Konecny (Germany) and Prof. Dr. Friedrich Ackermann (Germany).

d. ***Council for 1996-2000***

The following council members have been selected by the General Assembly at the 18th ISPRS Congress held in July 1996 in Vienna, Austria:

President Lawrence W. Fritz
Lockheed Martin Corporation
14833 Lake Terrace, Rockville, MD
20853-3632, USA

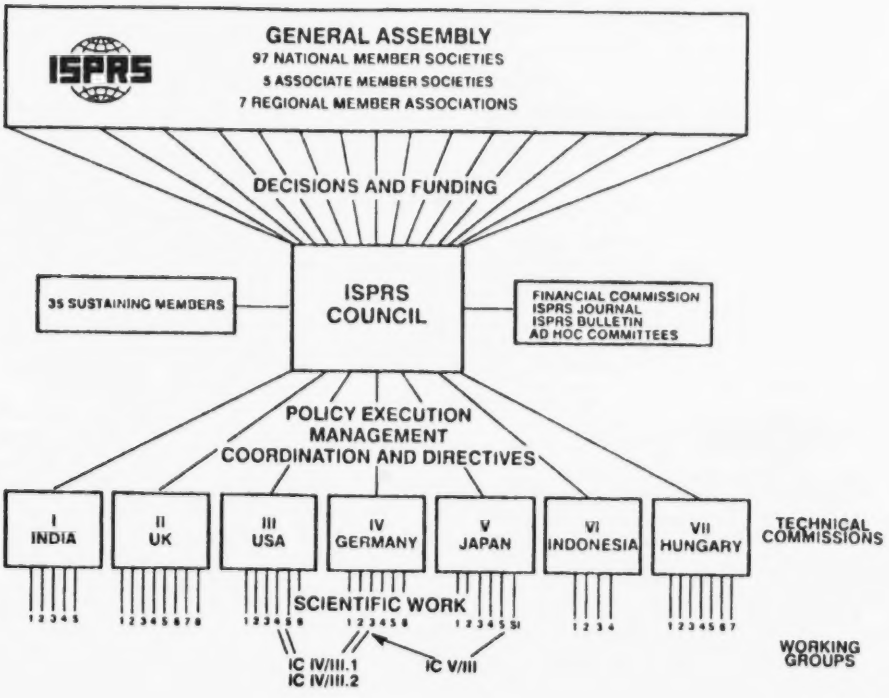
Second Vice President Marcio N. Barbosa
General Director, INPE
CP515, Av. dos Astronauts 1758
12227-010 Sao Jose dos Campos, SP, Brazil

Secretary General John Trinder
School of Geomatic Engineering
University of New South Wales
Sydney, NSW 2052, Australia

Treasurer Heinz Rüther
Dept. of Surveying & Geodetic Engineering,
University of Cape Town
Rondebosch 7700, Cape Town, South Africa

First Vice President Shunji Murai
Institute of Industrial Science
University of Tokyo
7-22-1 Roppongi, Minatoku, Tokyo
106 Japan

Congress Director Klaas Beek
Land Resources & Urban Sciences, ITC
P.O. Box 6, NL-7500, AA Enschede
The Netherlands



FUTURE SYMPOSIA AND CONGRESSES

The inter-congress Symposia which are hosted by the seven Technical Commissions will be held in 1998 as follows:

Commission	Date	Place
I	23-27 February	Bangalore, India
V	2-5 June	Hakodate, Japan
III	6-10 July	Columbus, USA
II	13-17 July	Cambridge, UK
VI	24-26 August	Bali, Indonesia
VII	1-4 September	Budapest, Hungary
IV	7-10 September	Stuttgart, Germany

Further information is available from the Technical Commission Presidents.

The 19th ISPRS Congress of Photogrammetry and Remote Sensing with the main Theme **"Geoinformation for All"** will be held in year 2000 as follows:

Date: 14-26 July
Venue: Amsterdam, The Netherlands
Congress Director: Professor Klaas Jan Beek
ITC, P.O. Box 6, NL-7500 AA Enschede, The Netherlands
Phone: +31-53-4874-214/Fax: 4874-200
E-mail: Beek@ITC.NL

TOPICS OF ADVANCED TECHNOLOGIES WITHIN THE SCOPE OF ISPRS

The following topics are relevant examples of the challenging technologies that are being studied by specific Working Groups as scientific work of ISPRS.

- ***Commercial Earth Observation Satellites***

Digital satellite imagery with resolutions finer than one meter in the panchromatic band and four meters in multispectral bands will be available from commercial sources beginning in late 1997 or early 1998. Products from these systems will readily meet the accuracy required for pansharpened orthoimage and topographic maps at 1:25,000 scale with 10 meter contour intervals and are expected in certain conditions to achieve 1:2,400 scale mapping. The topic is being primarily handled by WG IV/4 *"Mapping Using High Resolution Imagery"* (Chair: G. Konecny, Germany) and WG VII/*3 "Thematic Applications of High Spatial Resolution Satellite Imagery"* (Chair: B. Forster, Australia).

- ***SAR Interferometry***

New technologies and theories for airborne and spaceborne synthetic aperture radar (SAR) interferometry are being investigated for generation of digital elevation models (DEM) and for detecting subtle deformation of terrain surfaces such as those due to earthquakes and volcanic eruptions. Primary studies of this topic are being conducted by WG I/3 *"Sensors and Platforms for Topographic Survey"* (Chair: K. Jacobsen, Germany), WG II/4: *"Systems for Processing SAR Data"* (Chair: D. Corr, UK), WG III/6: *"Theory and Algorithms for SAR"* (Chair: L. Polidori, France) and WG VII/6 *"Radar Applications"* (Chair. T. Milne, Australia).

- ***Integrated Sensor Systems with GPS and INS***

The use of GPS and inertial navigation systems (INS) for determination of position and attitude of imaging sensors on air and space platforms provide breakthrough technology for improvements in near-real-time sensor orientation and accuracy and will virtually eliminate the need for ground control points for mapping from imagery. Mobile mapping systems equipped with vehicle borne digital cameras, GPS, INS, computer assisted mapping systems and telecommunication systems will be used as dynamic GIS data capture systems. These topics are being mainly addressed by WG I/5: *"Advanced Platforms and Sensors"* (Chair: T. Moriyama, Japan), WG II/1: *"Real Time Mapping Technologies"* (Chair: Rongxing Li, USA), and WG III/1: *"Integrated Sensor Calibration and Orientation"* (Chair: P. Agouris, USA).

- ***Digital Photogrammetry***

Digital photogrammetric workstation (DPW) design is still advancing technology for supporting automated mapping and precision image analysis systems. Current DPW systems have achieved full automation of interior orientation, relative orientation, aerial triangulation, DEM generation by stereo matching, and orthophoto mapping. However, planimetric mapping is semi-automated because human interpretation is still often needed for reliable detection and identification of natural and man made features. Investigations of the GIS data models, image analysis techniques, data fusion techniques and user requirements are being addressed by WG II/5: *"Systems for Integrated Geoinformation Production"* (Chair: C. Gurney, UK), WG II/8: *"Digital Systems for Image Analysis"* (Chair: C. Heipke, Germany), WG IV/III.2: *"Integration of Image Analysis and GIS"* (Chair: E. Baltsavias, Switzerland), and WG V/1: *"Close-Range Imaging and Metrology"* (Chair: C. Fraser, Australia),.

- ***Image Understanding***

Image understanding theories and algorithms for automated extraction of cartographic features from aerial photographs and space images are priority research topics. To fully automate planimetric and thematic mapping requires development of a reliable suite of feature and attribute recognition models and algorithms for detection, identification and delineation of features in the image extraction process. These topics are being studied by WG II/6: *"Integration of Image Understanding into Cartographic Systems"* (Chair: D. McKeown, USA), WG III/2: *"Algorithms for Surface Reconstruction"* (Chair: A. Krupnik, Israel), WG III/4: *"Image Understanding/Object Recognition"* (Chair: W. Eckstein, Germany), WG III/5: *"Remote Sensing and Vision Theories for Automatic Scene Interpretation"* (D. Wang, USA), and WG V/2: *"Integration of Photogrammetric Systems with CAD/CAM* (Chair: J. Peipe, Germany).

- ***3D GIS***

There is a need for research of new concepts in 3D GIS data models to develop applications required for urban information systems. Current 2D or 2.5D GIS data models are inadequate to describe 3D buildings and underground structures. Visualization techniques are being developed to support data quality assessment, simulations, and for creation of virtual reality models. These topics are being covered by IC WG IV/III.1: *"GIS Fundamentals and Spatial Data Bases"* (Chair: M. Molenaar, The Netherlands), WG IV/2: *"Digital Terrain Models, Orthoimages and 3D Urban GIS"* (Chair: R. Welch, USA), and WG V/3: *"Scene Modeling for Visualization and Virtual Reality"* (Chair: S. El-Hakim, Canada).

- ***Integration of Remote Sensing and GIS***

Remote Sensing as the source of current information should be integrated with an input system of GIS for better data capture and update of data bases. Research and investigations to develop and improve data fusion of multi-sensor, multi-spectral and multi-temporal remote sensing data are being studied. These topics are being addressed by WG II/2: *"Software and Modelling Aspects for Integrated GIS"* (Chair: M. Ehlers, Germany), and WG VII/4: *"Computer Assisted Image Interpretation and Analysis"* (Chair: B. Koch, Germany).

- ***Global Mapping***

Global mapping with satellite data is very essential for global change study and to support sustainable development. ISPRS will be able to contribute to methodologies and strategies for support of global mapping and global database developments, and to the development of environmental and sustainability indicators through the activities of WG IV/6: *"Global Databases Supporting Environmental Monitoring"* (Chair: R. Tateishi, Japan), WG VII/2 *"Application of Remote Sensing and GIS for Sustainable Development"* (Chair: D.P. Rao, India), and WG VII/5: *Global Monitoring* (Chair: S. Goto, Japan).

- ***Standards***

The complexity of advanced technologies brings the need for standards which will support interoperability and provide a common 'lingua franca' for the development disciplines and the user communities. Many ISPRS WG's are supporting the development of standards in pursuit of their activities.

SUMMARY

The institutional scheme of ISPRS and the scientific work being performed through its technical commissions and working groups will offer a great contribution to the development and applications of cartographic systems as well as for geographic information systems.

The ISPRS is ready to collaborate and cooperate in international or regional cartographic projects by providing its professionals and experts of the ISPRS related disciplines and applications.